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AN ACCURATE, LOW COST PARTIAL PRESSURE CALIBRATION APPARATUS FOR USE ON MASS SPECTROMETERS*

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The pressure calibration of mass spectrometers is essential to interpret generated ion currents in the form of species partial pressures, which can then be compared with the results of chemical kinetics modeling. Basford et al., have recently published a recommended practice for the direct comparison of mass spectrometer ion currents with an absolute pressure transfer standard such as a molecular drag gauge (MDG) or calibrated ion gauge (IG).[1] The high cost and high maintenance factors associated with an MDG make it difficult to apply in our laboratory. In addition, the use of organic vapors and associated contamination issues makes the use of an IG difficult to apply as a transfer standard as well. This paper describes the use of a capacitance manometer as the pressure monitor calibrating a mass spectrometer.

A comparison of the published performance of such a pressure standard with actual data will be shown and discussed relative to factors that can degrade that performance, such as temperature variations, electrical noise and thermal transpiration in the manometer itself. Repeatability studies will also be shown as well as the results of calibration of a mass spectrometer used to characterize the gas phase coating environment in a plasma polymerization reactor.

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[1] Basford, J.A., M.D. Boeckmann, R.E. Ellefson, A.R. Filippelli, D.H. Holkeboer, L. Lieszkovszky and C.M. Stupak, J. Vac. Sci. Technol. A, 11(3), A22, 1993.